

**COLLECTING CONSUMER STRUCTURAL CHARACTERISTICS DATA
BY MEANS OF SURVEYS**

The Ad Hoc Information Committee

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1. Introduction

This paper focuses on collecting data on consumer structural characteristics by means of surveys.¹ This data collection is one of the specific topics in the consumer characteristics portion of the Commission's OIR proceeding. This proceeding will develop recommendations for amending the Commission's responsibilities and activities related to data collection, analysis, and dissemination. In this paper, staff discusses some options for obtaining the necessary structural characteristics data. Also, particular problems in conducting surveys to obtain structural data in the new, restructured energy markets are presented. With this paper, staff hopes to facilitate discussion at the 10/13/98 workshop on consumer information alternatives.

2. Data needs

The Commission's need for consumer structural characteristics data is rooted in the Warren-Alquist Act (Public Resources Code Division 15). The act directs the Energy Commission

- to collect data to assess the availability and distribution of energy resources to meet the state's needs
- to undertake assessments of opportunities for cost-effective energy efficiency
- to forecast electricity system loads and resources.

In June 1998 the Commission's Ad Hoc Information Committee (AHIC) issued a report adopted by the Commission reaffirming the Commission's intent to collect data for monitoring energy industries and developing policy recommendations for the Governor and legislature. That report directs collection of data to support system modeling, which requires energy demand forecasts of considerable accuracy.

To carry out these functions, the Commission needs consumer structural characteristics and other data. Consumer structural characteristics data include information on consumers' appliance and equipment holdings, building characteristics, conservation measures and behavior, demographic and operation characteristics of firms, and load shifting opportunities and behavior. This information helps explain evolving consumption patterns for electricity, natural gas, and other fuels. It does so by pointing to factors that influence customers' choices of how much energy to consume as well as what options were available when they made their choices.

In the past, structural characteristics data were mainly used to develop input files for energy demand forecasting models, to provide data to assess the impacts of building standards, to assist Demand-Side Management/Market Transformation (DSM/MT) program planners by providing information on potential market segments and impacts, and to provide data for DSM/MT program evaluation. While these activities will continue in the future, the Commission also expects to make greater use of these data for market monitoring and policy analysis as energy markets transition to the new, restructured environment. For example, structural characteristics such as ability to shift load influence a customer's ability to respond to prices, thereby influencing daily and seasonal load patterns and the need for generating capacity. An estimation of this

¹ For an overview on surveying, see the paper entitled "Basic Steps in Conducting Surveys" prepared for the 10/13/98 OIR workshop.

need will be necessary to determine whether market signals are triggering an appropriate amount of generation capacity additions or deletions.

Finally, the data will also continue to support the Commission's role as the state's repository of energy data, thereby providing value to existing and new market players.

3. Historic data collection

In the past, the Commission obtained structural characteristics data mainly through its Title 20, California Code of Regulations, Section 1344, data collection regulations. These regulations required utilities to conduct end-use customer surveys in the residential and commercial sectors every two years and in the assembly industry sector every four years. Funding for Investor Owned Utility(IOU) surveys was through Public Utility Commission (PUC) approval of utility DSM budgets.

However, with the legislature's adoption of AB 1890 in 1996 and the introduction of electricity market restructuring, responsibility and funding for energy efficiency efforts shifted from the IOUs to an advisory board to the PUC, the California Board for Energy Efficiency (CBEE). Because the CBEE is not mandated explicitly to conduct end-use customer surveys, the future of these surveys has become uncertain. This paper presents several options for securing the continuation of these surveys so that the Commission can continue to receive the data needed to fulfill its functions.

4. Obtaining structural characteristics data in the future

Surveys are an appropriate vehicle for collecting structural characteristics data: accurate estimates can be developed from information collected from only a fraction of the population. Further, staff is not aware of other sources of this information and/or of sources that satisfy detailed data needs at comparably reasonable costs.

In the following, staff considers five survey options for future data collection in light of five evaluation criteria. Four of these criteria reflect various AHIC-proposed principles to use in guiding the rulemaking proceeding. These criteria are: 1) satisfaction of Commission data needs, 2) implementation issues, 3) burden versus benefit correspondence, and 4) cost considerations. The fifth criterion concerns data quality issues.

The first criterion is concerned with the degree to which the proposed data collection method satisfies Commission data needs. The second criterion, implementation issues, concerns the feasibility and practicality of implementing each of the methods. Burden versus benefit correspondence, the third criterion, examines likely burdens, duplication of efforts, and benefits to be expected from each method. The fourth criterion, cost considerations, compares likely costs with historic data collection costs. Finally, data quality issues, the fifth criterion, looks at important technical problems that arise with conducting surveys in the restructured electricity market.

4.a. Survey options

The five survey options are distinguished by which entities would administer structural characteristics surveys: 1) UDCs, 2) entities performing a retail energy service provider function including that portion of the UDCs that delivers electricity to retail customers (RESPs), 3) the

Commission (CEC), 4) a joint CEC/CBEE effort, and 5) a joint CEC/EIA effort, where EIA is the federal Energy Information Administration.

UDC administration. This option is a continuation of the current regulations. The UDCs would be responsible for conducting structural characteristics surveys on a regular basis. Commission staff would continue to participate mainly in sample design and questionnaire development stages to ensure that the surveys are well-designed and that Commission data needs are met. However, the Commission's role would be mainly advisory.

In the immediate future, while UDCs have billing data on nearly all customers, good sampling frames could be easily obtained from the UDC billing files. However, if metering and billing functions for direct access customers are increasingly performed by energy service providers (ESPs) or third parties, then sample frame development could become problematic for the UDCs.

Funding and survey implementation would be the responsibility of the UDCs as would data editing, including weight development and billing file merges. Both the edited data sets containing individual responses and the survey documentation would be submitted to the Commission. Data sets would automatically receive confidential status in accordance with recent approval of revised data confidentiality regulations.²

RESP administration. In this option, entities performing a retail energy service provider function, including that portion of the UDCs that delivers electricity to retail customers, would be responsible for conducting the surveys. The Commission's role would be mainly advisory, as in the UDC option. However, there would be much greater coordinating responsibilities for the Commission in this option because of the greater number of RESPs. Also, at least initially, Commission staff would play a larger role in bringing new ESPs up the survey learning curve.

Sample frames based on RESP billing files would be comprehensive. Funding and survey implementation would be the responsibility of the RESPs as would data editing, including weight development and billing file merges. Both the edited data sets and the survey documentation would be submitted to the Commission, with the data sets being classified as confidential.

CEC administration. The Commission would be responsible for conducting structural characteristics surveys in this option. All survey steps³ would therefore be performed by the Commission and/or its contractors. The Commission would also be responsible for funding these surveys and would need the legislature to allocate new funds for this purpose.

Without RESP billing files, sample frame development would be problematic as no other population sources can be compiled into a complete population list. Other tasks dependent on billing file information would also pose difficulties, e.g., weighting. Survey data sets would reside at the Commission and would be treated confidentially.

CEC/CBEE administration. In this option, the Commission and CBEE jointly sponsor structural characteristics surveys. Possible Commission roles range from assuming the main responsibility for the surveys and consulting with CBEE to ensure that CBEE needs are met to playing an advisory role, where CBEE assumes responsibility for conducting the surveys and consulting with the Commission to make sure Commission data needs are met. The Commission is currently discussing various survey sponsorship arrangements with the CBEE. If the agencies reach

² Commission data confidentiality regulation proposals were approved by the Office of Administrative Law effective August 8, 1998. Title 20, California Code of Regulations, Section 2505(a)(5) provides for automatic designation of certain individual customer data derived from energy consumption metering, energy load metering research projects, or energy surveys conducted by mail, telephone or on-site inspection.

³ See "Basic Steps in Conducting Surveys."

agreement, the Commission expects to arrive at a role configuration that takes advantage of each agency's expertise and needs. Because data needs are similar but do not completely overlap at the Commission and the CBEE, the Commission can expect to conduct other surveys to meet Commission-unique data needs.

In order to ensure statewide coverage, utilities that still have an obligation to serve would be responsible for conducting their own surveys. The Commission would have an advisory role for these surveys, much like the current role. How to coordinate these and joint CEC/CBEE surveys is an unresolved problem.

Survey implementation and data editing for the CEC/CBEE surveys would be the responsibility of the survey project managers and their contractors. Deliverables would require the approval of both the Commission and the CBEE. Since individual-level survey responses and billing data are necessary for meaningful analyses, the Commission and CBEE would have to develop data sharing arrangements that also protect these confidential data. Publicly-owned utilities would be required to submit survey data sets and survey documentation to the Commission under confidentiality guarantees.

CEC/EIA administration. In this option, structural characteristics surveys are a joint effort by the Commission and the EIA. Possible roles for the Commission are more limited in this option than in the CEC/CBEE option. In this option, EIA's flexibility to accommodate Commission participation and needs will be constrained by its obligation to collect data to develop national estimates and by its own bureaucratic processes. It is likely that EIA would assume the main responsibility for the California portion of the surveys or that responsibility might be shared. It is unlikely that the Commission would be the main project manager for this portion.

Sample frame development would need to be negotiated with EIA. It is unclear whether EIA would incorporate a separate and different sample design for the California portion of the survey in the event the Commission could provide a complete frame (based on RESP billing file information, for example). Currently, EIA budgets enough sample points to be able to develop California statewide estimates of the residential sector but only broader Census division level estimates of the commercial sector. The Commission would have to fund an EIA sample expansion in order to obtain estimates both at a more detailed geographic level such as ISO congestion zone as well as at a more detailed characteristics level, e.g., housing type by ISO congestion zone by heating fuel type. Expanding the EIA samples would be expensive under the current sample design which utilizes canvassing and enumeration of buildings to draw up sample frames. Likewise, EIA would require the Commission to provide additional funds to do onsite audits instead of in-person interviews in the nonresidential sector (currently, EIA conducts in-person interviews in this sector; however, onsite audits are necessary to obtain accurate data on the complex equipment in that sector.). The Commission would need the legislature to allocate new funds for this purpose.

Survey implementation would be an EIA responsibility with Commission input and oversight. Data editing and billing file merges would also be an EIA task. As with the CEC/CBEE option, the Commission and EIA would need to develop data sharing arrangements that protected confidential data.

4.b. Review of options

The UDC option is a status quo option. On the other hand, the other options require new players to perform data collection activities. The RESP option requires new energy service providers as well as established UDCs to collect structural characteristics data. The remaining three options require the Commission to either collect the needed data or to partner with other agencies in data

collection (as compared to the advisory role the Commission has played with historic UDC data collection). The CBEE is a new player, replacing UDCs in the market transformation (MT) arena. Staff expects the CBEE to be active in collecting data related to MT program planning and evaluation. Since these data are likely to overlap with some data needed by the Commission, the Commission is investigating jointly-administered surveys with the CBEE. Finally, the EIA currently conducts structural characteristics surveys on a four year cycle with a focus on developing national and regional estimates of energy use and associated characteristics.

Table 1 compares these five survey options on the five criteria mentioned above. The five criteria are again: 1) satisfaction of Commission data needs, 2) implementation issues, 3) burden versus benefit correspondence, 4) cost considerations, and 5) data quality.

Table 1

Comparison of Survey Options for Collecting Consumer Structural Characteristics Data

Criteria	UDC Administration	RESP Administration	CEC Administration	CEC / CBEE Administration
Satisfies CEC information needs	CEC data needs not compatible with UDC functions	Possible overlap between some CEC and RESP data needs	Yes	Similar data needed, especially for MT program planning and evaluation
		CEC will need other sources for some data		CEC will need other sources for some data
	Oversight and compliance enforcement likely to be necessary	Data confidentiality could be an issue affecting compliance		Data sharing arrangements required
Implementation Issues	Existing expertise in UDCs	Steep learning curve for new energy service providers	Existing expertise	Expertise at CEC and presumably by CBEE program administrators
	Funding and implementation coordination would be moderately burdensome for statewide surveys	Coordinating survey efforts among numerous providers would be burdensome for RESP and CEC staffs	Centralized administration promotes statewide coverage at same point in time	Requires coordination with utilities that still have obligation to serve in order to obtain statewide results
	CEC directive/oversight role needs to be continued	CEC directive/oversight role needs to be established	Role clear	CEC directive/oversight role needs to be established
Burden versus Benefit Correspondence	No known benefit to UDCs of survey results	Possible marketing benefits to RESPs of survey results	Direct benefit to CEC	Benefits to CEC and CBEE especially for MT planning and evaluation
	May duplicate some CBEE and EIA efforts	May duplicate some CBEE and EIA efforts	May duplicate some CBEE and EIA efforts	May duplicate some EIA efforts
		Widespread duplication among RESPs surveying same geographical populations		

Criteria	UDC Administration	RESP Administration	CEC Administration	CEC / CBEE Administration
Total Cost Compared to Current Regulations	Same	<p>More expensive due to larger number of survey administrators and duplication in some geographic areas</p> <p>Relatively more expensive for smaller RESPs</p> <p>Possible equity issues with municipals and other similar utilities</p>	<p>Unknown at this time; possible economies of scale in survey administration may be offset by sample frame development costs</p> <p>Requires major increase in funding for the CEC through the state's budget development process</p>	<p>Unknown for same reasons CEC-administered surveys</p> <p>Assumes CBEE provides funds, especially if no CEC funds are available</p> <p>May require increased CEC funds for CEC-specific data collection</p>
Technical Survey Issues	Sample frame complete as long as UDCs have access to meter and billing information	Sample frame complete	Sample frame development problematic without billing file information	Sample frame development problematic without billing information
	Fairly consistent questions and procedures likely	Consistency in questions and procedures very unlikely	Consistency assured	Consistency assured

Looking across the table, staff notes that the larger the Commission's administrative role, the greater the likelihood that surveys will satisfy Commission data needs. The table also reveals that compliance issues need to be resolved for successful data collection. For the UDC and RESP options, the issue is UDC and RESP compliance with a possible Commission regulation requiring survey activities. Also, associated enforcement mechanisms will need to be specified for Commission use. This issue arises because of the discrepancy between benefits and burdens that a survey requirement imparts and the consequent disincentive to conduct the surveys. For the CEC/CBEE and CEC/EIA options, the issue is assurance that the participating agencies have access to each other's primary survey data, given the necessary confidentiality protections.

For implementation issues, most options can utilize existing expertise to administer structural characteristics surveys, though the new RESPs may need to develop survey implementation knowledge and experience. For options other than CEC administration, coordination issues arise. In particular, it is debatable whether the Commission could require all surveying entities to schedule, budget, and conduct surveys on the same time schedule. Similarly, the Commission's ability to provide direction and oversight also needs to be established in areas such as survey content and sample design.

With respect to burden versus benefit correspondence, the table shows that UDCs and RESPs may experience few or no benefits from structural characteristics survey results whereas the other options provide greater correspondence of benefits versus costs to the parties involved. There is some duplication of effort, particularly with EIA. The number of EIA sample points in California is small, and such duplication would be minor for residential and small non-residential customers. The likelihood will be somewhat greater for large commercial and industrial customers. RESPs or their billing service agents would also be required to provide information on sampled customers in both the EIA and other surveys. It is worth noting that another form of duplication exists with the RESP option, where RESPs serving the same geographical regions would come to survey customers with possibly similar characteristics. The number of sampled customers in a given geographical region would therefore be greater than if the survey were administered centrally.

Comparing costs, the table shows that there are uncertainties at this time about the costs of CEC, CEC/CBEE, and CEC/EIA administered surveys. Much of the uncertainty stems from potential problems in developing a sample frame if billing data are not available. Otherwise, there would likely be cost savings due to economies of scale in survey administration and in reduced sample sizes. It is likely that the RESP option would be more expensive than the status quo option due to the duplication of administrative functions and the larger sample sizes in given geographical areas.

Most options would require increased funding obtained either through regulatory redirection for the UDC option, through prices in the RESP option, or through legislative action for the CEC options. Even with a CEC/CBEE option where CBEE funds all surveys, the Commission would need extra funding for surveys to collect Commission-unique data. For the RESP option, there is also a question of inequitable risks between private and public energy service providers.

4.c. Major technical issues

Finally, the main technical survey issue concerns sample frame development. It is important to develop a sample frame, or list of the units in the targeted population, that is complete. The sample will be drawn from this list, and when the list is incomplete, the sample may not represent

the population and resulting survey estimates will be biased. UDC and ESP billing file information provides the best basis for sample frame development. Thus, without this information, sample frame development will be especially problematic for CEC and CEC/CBEE surveys. EIA resolves this problem by employing a multistage survey design. In its last stages this design involves canvassing selected neighborhoods to enumerate all units for frame development. This option would be very expensive if utilized in a joint CEC/EIA survey due to the Commission's need to obtain data at the more detailed ISO congestion zone or county level. In addition, EIA would need to modify its non-residential data collection from in-person interviews to onsite audits in order to collect accurate information. In the non-residential sector, with its complex equipment, business operators often do not know the characteristics of such equipment, and therefore, self-reported data tend to be inaccurate. Finally, the table points to greater consistency in survey content, implementation, and design with greater Commission involvement.

5. Conclusion

This paper presents five survey options and compares them against criteria reflecting rulemaking principles and technical survey issues. Table 1 presents an overview of this comparison. A review of the table reveals that there is no single option that ranks high on all five criteria. Thus, the Commission must trade off advantages on one criterion versus disadvantages for others.

Staff's current assessment

Commission staff is actively negotiating with the CBEE for energy efficiency surcharge funds to cover clearly overlapping information needs, e.g., residential structural characteristics data. Also, the Commission is pursuing an increased data collection budget through the state budgeting process for data judged to be less or not useful to the CBEE but necessary for the Commission, e.g., self-generation data. Given the mismatch between benefits and costs, Commission staff views the UDC and RESP options as much less desirable than the CEC or CEC/CBEE options, while staff believes the CEC/EIA option may be appropriate for some specific projects.

Staff hopes that this paper will provide background for discussing the tradeoffs among the options at the 10/13/98 workshop as well as encourage participants to suggest other criteria and options. Narrowing the range of options will help by enabling parties to focus their limited resources on fleshing out details for viable options.